Mindset and Communication Barriers in the Diffusion of Bariatric Surgery

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Abstract: Purpose of Review Cumulating evidence is available to demonstrate the efficacy of bariatric surgery (BS) in achieving weight loss and optimizing comorbidities. However, currently, only a minority of eligible patients approaches bariatric centers. The underuse of BS can no longer be explained by the lack of evidence supporting its beneficial outcomes along with its favorable safety-profile, rather, by the supporting infrastructure, insurance coverage, and mindset of society, including potential patients and allied healthcare professionals. As a framework to approach mindset barriers in the diffusion of BS, we used the Rogers' levels of the innovation adoption process: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. Recent Findings Knowledge: people tend to believe that obesity is a result of lack of willpower and they have difficulties in differentiating BS from cosmetic surgery. Eligible patients often do not assess themselves as being morbidly obese and are unaware that they would qualify for BS. Persuasion: majority of BS candidates search health information online, with the aim of getting information about surgical techniques and other patients' experiences. Decision: metabolically more compromised patients are more likely to opt for BS. Implementation: general practitioners who already referred patients for BS seem to be more confident to refer again, to tackle obesity and manage postoperative follow-up. Confirmation: postbariatric patients seem to be more self-confident and more productive at work; however, their stigmatization might prevail related to the way they have achieved weight loss. Summary Dissemination of balanced and corroborative information seems to be the main instrument to combat mindset barriers. The integration of general practitioners under the umbrella of bariatric centers has a great potential to increase referrals. Social media may represent a helpful tool to be used by medical professionals and patient-role models to improve confident decision-making of bariatric candidates.

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Mindset and communication barriers in the diffusion of bariatric surgery

Running title: Mindset on bariatric surgery

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Abstract

Purpose of review

Cumulating evidence is available to demonstrate the efficacy of bariatric surgery (BS) in achieving weight loss and optimizing comorbidities. However, currently only a minority of eligible patients approaches bariatric centers. The underuse of BS can no longer be explained by the lack of evidence supporting its beneficial outcomes along with its favorable safety-profile, rather, by the supporting infrastructure, insurance coverage and mindset of society, including potential patients and allied healthcare professionals. As a framework to approach mindset barriers in the diffusion of BS, we used the Rogers' levels of the innovation adoption process: 1) *knowledge*, 2) *persuasion*, 3) *decision*, 4) *implementation* and 5) *confirmation*.

Recent findings

Knowledge: people tend to believe that obesity is a result of lack of willpower and they have difficulties in differentiating BS from cosmetic surgery. Eligible patients often do not assess themselves as being morbidly obese and are unaware that they would qualify for BS. *Persuasion:* majority of BS candidates search health information online, with the aim of getting information about surgical techniques and other patients' experiences. *Decision:* metabolically more compromised patients are more likely to opt for BS. *Implementation:* general practitioner who already referred patients for BS seem to be more confident to refer again, to tackle obesity and manage postoperative follow-up. *Confirmation:* postbariatric patients seem to be more self-confident and more productive at work; however, their stigmatization might prevail related to the way they have achieved weight loss.

Summary

Dissemination of balanced and corroborative information seems to be the main instrument to combat mindset barriers. The integration of general practitioners under the umbrella of bariatric centers has a great potential to increase referrals. Social media may represent a helpful tool to be used by medical professionals and patient-role models to improve confident decision-making of bariatric candidates.

Keywords

obesity – bariatric surgery – mindset – weight bias – communication – social media – online resource - stigma

Introduction

In a study on reasoning foundations of medical diagnosis, *Ledley et al.* concluded that the "choice of treatment involves an evaluation and estimation of a complicated conflict situation that not only depends on the established diagnosis but also on therapeutic, moral, ethical, social, and economic considerations concerning the individual patient, his family, and the society in which he lives" [1]. The treatment of *obesity* is further complicated by misperceptions about the diagnosis itself. Although the World Health Organization and many prestigious scientific bodies recognized obesity as a disease (ICD-10 code E66), obese people often have to face stigma, discrimination and accusations that they are victim of their own lack of discipline or willpower [2]. Currently, only a small minority of patients with obesity receives clinically proven dietary, medical, lifestyle, and/or surgical treatments, that evidence-based guidelines would recommend [3].

Bariatric surgery (BS) has become standard of care in the management of severe obesity, and is now in the final stage of the surgical innovation process according to the IDEAL (innovation, development, exploration, assessment, and long-term study) model [4].

Nevertheless, innovation seldom spreads instantaneously; instead, it requires a lengthy period from the time when it becomes available to the time when it is widely adopted [5]. *Rogers* staged the levels of the innovation adoption process to 1) *knowledge*, 2) *persuasion*, 3) *decision*, 4) *implementation* and 5) *confirmation* [6]. Further, he described the diffusion of innovation as a determinant of the mindset of its adopters. In his framework, the first users are the venturesome innovators, followed by the early adopters who act as a role model for society. Later, the innovation is taken up by an early majority who are deliberate before adopting a new idea, followed by the late majority, a rather skeptical and cautious group. The last adopters are the laggards, who are suspicious of innovations, they have a point of reference in the past, and often lack sufficient resources.

In this review, we present an overview on recent literature with the aim to identify mindset barriers across the stages of the innovation adaption process that remain to be addressed to facilitate the diffusion of BS (e.g. Roux-en-Y gastric bypass [RYGB] and sleeve gastrectomy [SG]). We acknowledge that our conceptual framework is somewhat subjective and there are several overlaps within the presented stages.

KNOWLEDGE on benefits and risks of bariatric surgery

Knowledge on the efficacy of BS is constantly increasing. More than 10 RCTs showed that BS is superior to non-surgical treatment options (medical, dietary and lifestyle) of obesity and type 2 diabetes mellitus (T2DM) [7]. Further, BS has a beneficial impact on lipid profiles [8], cardiovascular risk and hypertension [9], quality of life [9], sleep apnea [10], polycystic ovarian syndrome [11], cancer risk [12], and ultimately, on survival [13]. However, BS has also its downsides. These include a low, but not null, perioperative morbi-mortality [14]. The signature complications of BS may manifest throughout the patients' life, and could be categorized as: surgical (internal hernia, pouch dilation, anastomotic ulcer, gastro-esophageal reflux, etc.) [15], medical (nutritional deficiencies, kidney stones, bone fragility, hyperinsulinemic hypoglycemia, etc) [16] and psychiatric (self-harm, substance abuse) [17]. The likelihood of consultations to emergency departments and accumulation of diagnostic irradiation by computer tomography might be also elevated after BS [18]. RYGB has the additional sequel of making the choledochus inaccessible orally, complicating the eventual future treatment of bile duct lithiasis, which is why some surgeons advocate concomitant prophylactic cholecystectomy [19]. Although there is a return on investment after ~5 years (as expressed by increased survival, increased quality of life and decreased costs related to the treatment of comorbidities), the operation has a non-negligible initial price (in USA: $20,000 to $50,000; depending on the center [20]) [21]. The best achievable complication rate of primary BS, aka benchmark, expressed by the comprehensive complication index (CCI®), is currently under investigation

by our study group at the University Hospital Zürich, using the benchmarking methodology previously applied in liver transplantation and esophagectomy [22-23].

Overall, when the surgery is performed in an experienced center and is combined with strenuous follow-up, the outcomes of RYGB are promising, even in the long-term [24] and also in adolescents [25]. 10-year data for sleeve gastrectomy is currently scarce [26], whereas for gastric banding, a failure rate of over 90% at 12 years has been identified, leading to an almost complete abandoning of this procedure [27]. Although the exact physiologic mechanisms of BS are not completely understood [28], its clinical efficacy is well documented, therefore a lack of knowledge about BS should no longer be considered as a factor limiting its diffusion.

PERSUASION or dissemination of the knowledge from experts to patients

The *Rogers* model of diffusion of innovation uses "persuasion" to describe the second step of the process [6]. We are advocates of shared decision-making in the treatment of patients, thus we avoid using "persuasion", instead, in this chapter give an overview on the identified pitfalls in knowledge dissemination.

In 2010, *Afonso et al*. surveyed 77 morbidly obese patients in Florida during routine outpatient appointments or hospitalization for other reasons to identify barriers to undergoing BS [20]. The results revealed multifactorial domains of mindset barriers. Only 30% of the patients assessed themselves as being morbidly obese (*definition of obesity as a disease*), 57% reported that they were currently in a weight loss program, 13% were unaware that they qualified as a candidate for a weight loss procedure and 8% had never heard of bariatric surgery (*indications for BS*). 57% of the patients were not interested in a surgical procedure to manage their weight, 45% were concerned about the risk of death and complications (*knowledge of risks*), 30% of patients stated that their primary care physicians did not recommend the procedure (*implementation of BS*), further, 27% of the patients believed the surgery would not be covered by their insurance (*access to BS*). The same year, *Teo et al*. asked the general public in

Singapore about their perceptions on BS [29]. 58.4% of the surveyed population has not heard of surgery as a modality for management of obesity, only 41.6% knew that bariatric surgery was a medical procedure, while 28.5% felt that it was a cosmetic procedure and 29.9% were unsure. More recently, *Champion et al.* investigated how women interpret the content of online articles and related comments on BS [30]. They found that respondents were frustrated by BS being presented by the media as an overwhelmingly positive and effective means of weight loss. When articles focused on the 'obese' readers rather than a general readership, respondents lost their interest in reading the articles in full because they did not perceive themselves as the target audience. The women perceived the comments as useless and believed that commenters are only trying to get their opinions heard and do not generate a balanced discussion. Nevertheless, a study involving candidates for BS at a French hospital showed that ¼ of patients decided to undergo surgery mainly based on e-information and over ¾ of BS candidates searched for BS online, with the main goal of getting information about surgical techniques and other patients' experiences [31]. Their most trusted web-sources were affiliated to public hospitals or edited by other patients. In the vast majority of cases, the information obtained online was further discussed with their primary care physician (PCP) as well as family members and friends.

A systematic review explored the differences in sociodemographic characteristics of patients eligible for BS and those who actually received the procedure [32]. The following inequalities were found: BS patients were significantly more likely to be White than non-White (OR 1.54), have private insurance (OR 2.51), be female (OR 2.80), live in urban areas (OR 1.45) and aged between 18 and 50 years versus over 50 years (OR 2.39). *Wee at al.* performed telephone interviews with 337 patients with a BMI > 35 kg/m^2 who were seen in different PCP practices in Greater Boston, to investigate how socio-demographics influenced recommendations for BS [33]. PCP recommendation was determinant for consideration of BS (OR 4.95), however, only 20 % of patients reported being recommended BS by their PCP and African Americans and

men were less likely to receive this recommendation. The most frequently mentioned deterrent from surgery was the patients' perception of BS being "too risky". Another telephone survey conducted in Washington State showed that significant predictors of ever having discussed BS with a physician were BMI (OR: 1.2) and number of comorbidities (OR: 1.7 for each additional comorbidity) [34]. Females, patients with comorbidities and those having a bariatric insurance "rider" thought more often about surgery and half of patients were interested in learning more about BS. In 2012 at a University Hospital in New York, potential BS patients had to attend an educational seminar on the differences in outcomes, follow-up appointments, and complication profile of RYGB, SG and gastric banding [35]. With this approach, 81% of BS candidates have already decided which procedure they wanted prior to the surgeon consultation. The authors underline the benefits of shared decision making, which integrates patient values and preferences with the current state of medical knowledge.

Influencers of the DECISION-making in the context of bariatric surgery

Due to the tradeoff between achievable benefits and perioperative risks together with life-long commitment, the decision to undergo BS results from a complex analytic process (Table 1). *Gradaschi et al.* investigated differences in clinical conditions, behavioral characteristics and psychological status between self-referred BS patients and their medically treated counterparts at the University of Genova [36]. The results reflected a very pragmatic decisional mechanism: *metabolically more compromised patients* opted more often for BS, and there were no other differences between the two groups in demographic, anthropometric and clinical data, neither in obesity onset nor in dieting behavior. *Schauer et al.* administered a 64-item survey to assess potential predictors of having BS among patients who self-referred themselves to an interest group meeting at the University of Cincinnati Medical Center [37]. Those who had surgery (only 33% of those who attended an interest-group meeting) or still planned to have surgery had *poorer quality of life* (perhaps reflecting a higher degree of comorbidities), but were *more*

confident in decision making than those who rejected BS. Among patients who decided against surgery, over 1/3 gave "*Worried about the risks*" as primary reason for their decision, whereas "*Insurance would not cover*" was mentioned by 16%. The authors concluded that patient decision aids should focus on decreasing decisional conflict and increasing self-efficacy of the eligible patients. *Wee et al.* telephone-surveyed 574 severely obese patients who already consulted at a BS center [38]. In conjunction with standard health utility questionnaires, respondents were asked to consider a hypothetical choice: the certainty of continuing in their current health and weight or taking a gamble with two possible outcomes: "perfect health" or "immediate death". Surprisingly, patients' hypothetically agreed to accept a dichotomist gamble that offered to achieve their preferred weight/heath state with 87% chance, with a 13% risk of dying. Further, public distress or social stigma associated with obesity was one of the most important factors contributing to the diminished quality of life of respondents. This suggests the importance of campaigns addressing the general population's mindset to influence societal values against weight bias. *Trainer et al.* performed an ethnographic study on severely obese patients who decided whether or not to have BS. Patients undergoing surgery often explained their decision by medical necessity or even by surgery's "life-saving" character, in contrast to patients opting for conventional therapy, who would stress the absence of medical need for BS. This study suggests changing the "marketing strategy" of bariatric program providers from "surgery-for-weight-loss" to "surgery-for-health", to be in harmony with patients' motivational narratives [39].

IMPLEMENTATION of bariatric surgery into the health-care system

Utilization of BS shows high variances across countries, not only depending of differences in the prevalence of obesity, albeit related to the attitude of policy-makers (tax-payers, agencies and governments), reflected by national guidelines, supportive infrastructure and degrees of reimbursement [40]. Recent recommendations published in *The Lancet* emphasize the use of

stratified management schemes, the need for training professionals with adapted skills, the creation of links between clinical and community resources, as well as implementing strategies to reduce the health professionals' weight bias [41].

Gill et al. investigated views regarding prioritization and willingness to pay for BS among patient enrolled in a Canadian weight loss program [42]. Patients preferred if waiting for BS was prioritized based on clinical severity and functional impairment rather than on the traditional first come, first served approach. Also, most respondents were against allowing out-of-pocket payments to expedite surgery. However, to get listed for surgery, patients often need PCP referral. *Tork et al.* evaluated potential barriers to BS referral among PCPs in Ohio [43]. Out of the 57 respondents, only 65% believed that they were familiar with indications for BS, 70% felt comfortable discussing it as a treatment option with their morbidly obese patients; however, only 44% felt confident in providing postoperative management. 63% argued that educational pamphlets and seminars to PCPs on BS would increase referrals. At the time of the study, only 26% had information about the availability of their referral BS center, 39% believed that diet and exercise were effective means of obtaining sustained weight loss, further, 53% supposed that most of their patients could not afford BS. *Funk et al.* made similar observations via focus group discussions with PCPs in Wisconsin [44]. The concept of treating "obesity first because it is the common denominator underlying other co-morbid conditions" was not unanimously applied. PCPs often prioritized therapeutic plans based on easiness to treat, perceived danger of the condition and patients' preferences. PCPs admitted to be reluctant to refer patients to BS for the following reasons: to avoid harm, lack of knowledge on BS, reserving BS for later and doubt about insurance coverage. *Jung et al*. further analyzed referral behavior of PCPs and internists in Germany [45]. They observed that PCPs had a slightly negative attitude towards overweight or obese people. The majority of respondents also believed that "having no willpower" was the main reason for excess weight. Interestingly, the frequency of recommending BS to their patients significantly correlated with the amount of

information PCPs knew about BS and with the expected weight loss it could provide, but not with stigmatization of obesity. The most striking observation was that the usual frequency of BS referrals was the only predictor that significantly increased the likelihood of a further BS referral (OR = 2.169, p = 0.043).

Little is known about the acceptance of BS for a metabolic indication, such as T2DM. *Sarwer et al.* studied the beliefs of patients with T2DM and a BMI of 30-40 kg/m^2 [46]. Almost half of the patients were "neutral" or had "no opinion" about how well BS would improve TDM2, and only a minority of patients believed that BS was a safe treatment for T2DM and <20% of respondents indicated willingness to participate in a randomized research study of BS. Semi-structured interviews performed by *Summers et al*. on a similar cohort found that most subjects would consider to take part in such studies only if they were assigned to the medical treatment arm [47]. The most influential themes to determine the individual's stance on the appropriateness of BS were 'condition-related life impact' (perceived threat of metabolic syndrome to their own health and well-being) and 'perceived control' (feeling incapable to exert weight loss or control comorbidities). PCPs were correspondingly unenthusiastic about investigating the effect of BS on T2DM in less obese individuals: in the Philadelphia area only 20% would have referred a patient with a BMI 30-35 kg/m2 to such a clinical trial [48].

CONFIRMATION or perception of bariatric surgery by the patients and society

Literature on postbariatric mindset is scarce. In-depth interviews revealed that despite a frequent feeling of alienation toward themselves in the early phase of rapid weight loss, postbariatric patients tend to perceive a happiness due to invisibility in public spaces, which helps them feel more normal and self-assured [49]. However, memories of feeling stigmatized and the stigmatization of obese individuals in the process of hiring, wages, promotions, and job termination does not seem to stop after surgically achieved weight loss [50]. *Carels et al.* found that employers were more likely to hire a new employee if they had lost weight behaviorally

vs. surgically [50]. Nevertheless, following BS, patients tend to experience marked reduction in work impairment and an improvement in work productivity [51].

A large-sample study recently demonstrated that the general population in Germany is still rather skeptical about BS and views lifestyle-based interventions as the most effective measures to achieve weight reduction [52]. The same study further showed that *self-help* via *the internet* has increased in popularity, and could represent an ideal avenue to trickle-down evidence-based data from professionals to the individuals.

Incorporating obesity in medical / para-medical education is another arm against the epidemic [53]. *Acosta et al.* observed an improvement in attitudes and practice behaviors towards obesity in trainees who attended an obesity-specific didactic curriculum in their internal medicine residency program, however, the level of knowledge and BS referrals remained unchanged [54].

Future outlook and potential strategies to address mindset barriers

Based on the current literature review, mindset barriers of BS seem to be mainly related to the lack of information, to incorrect information and to weight bias (Table 2). BS candidates are often unaware of the potential future complications of obesity and of the available treatment options. Those who have heard about BS might overestimate its risks and fail to balance it against the default option of not taking effective measures against their current obesity. The general population does not always feel concerned by the obesity epidemic, tend to stigmatize its victims and when it comes to building an opinion about surgical options, the conceptual differences between BS and cosmetic surgery are often blurred. PCPs are the gatekeepers of BS, their medical advice and capacity of identifying eligible patients represents a key factor in informed decision-making on BS.

Future strategies to address mindset barriers should be adapted to the different target audiences. Regular thematic media presence of “obesity” interspaced with special campaigns might be valuable in informing the general population. When it comes to communication with BS

candidates, the traditional evidence-based arguments seem to be insufficient. Besides information, patients also need confirmation from their peers, who acted as *early adopters* of BS and they often seek encouragement from their PCP and from their non-obese friends and family. Experiential sharing among like-minded individuals across a community is a powerful strategy to accelerate quality improvement in healthcare [55]. This can successfully take place online as well, within thematic and moderated self-help groups. Further, one of the main goals of bariatric professionals should be to strive to integrate PCPs into bariatric centers' activities, and to acknowledge their pivotal role in organizing referrals and postoperative follow-up [56]. Decreasing weight bias and demystification of BS among PCPs might be supported by structured post-graduate teaching programs, creation and distribution of e-materials, round-the-clock bariatric availability for emergencies and by regular feedback from the bariatric center on the referred patients' outcomes and on latest guidelines and care maps. Online referral systems represent an innovative approach to increase PCPs willingness to refer patients to bariatric centers [57].

Conclusion

BS is underused by eligible patients, in part due to mindset barriers. Bariatric professionals should operate with targeted "*marketing strategies*" to influence allied healthcare providers and public opinion. They need to take part in updating and mentoring PCPs on the implementation of the newest guidelines and developments in the field of obesity and recognize them as team members within the chain of care. On the general population level, professionals should seek to dispel common misconceptions regarding BS, and deliver balanced and regularly updated information. Social media should be used to its full potential by medical professionals and by patient role models (e.g. famous people who underwent BS). The aim is to improve confident decision making by creating a dialogue with target audiences, who often seek healthcare

information online and use online interactions with their peers and doctors to build their mindset on obesity and on strategies to overcome it.

Compliance with Ethical Standards

Conflict of Interest

Daniel Gero, Bors Hulesch and Marco Bueter each declare no potential conflicts of interest.

Human and Animal Rights and Informed Consent

This article does not contain any studies with human or animal subjects performed by any of the authors.

Tables

Table 1. Patient-related mindset factors in favor and against seeking bariatric surgery

Facilitator for seeking BS	Barriers for seeking BS
"surgery-for-health" concept [39]	"surgery-for-weight-loss" concept [39]
e-information provided by public hospitals or other patients [31]	never heard of bariatric surgery [20]
educational seminar in bariatric centers [35]	failure to recognize themselves as morbidly obese [20]
higher confidence in decision making [37]	primary care physicians did not recommend BS [20]
bariatric insurance «rider» [37] [34]	believes BS to be a cosmetic procedure [29]
poorer obesity-related quality of life [37]	worries about the risks [37]
metabolically more compromised state [36], [34], [38], [47]	

Table 2. Knowledge and mindset barriers in the diffusion of bariatric surgery (BS) in the general population, among potential candidates and among primary care physicians (PCP).

	Lack of knowledge	Wrong knowledge	Weight bias
General population	not heard of surgery as a modality for management of obesity [29]	think that BS is a cosmetic procedure [29]	obesity results from lack of discipline / willpower [2, 38]
		lifestyle-based interventions perceived as the most effective measures to achieve weight reduction in morbidly obese patients [52]	no interest in reading about BS [30]
			achieving surgical weight loss is "cheating" [50]
Bariatric candidates	failure to recognize themselves as morbidly obese [20]	overestimating surgical mortality and morbidity [20, 33, 37]	feeling guilty and ashamed (=internalization of the stereotype that obesity results from lack of discipline / willpower) [58]
	never heard of bariatric surgery [20]	believe that BS would not be covered by insurance [20, 37]	feeling ignored by healthcare professionals [58]
	BS not been recommended by PCP [20, 33]		constructing a restricted life [58]
Primary care physicians	unsure to be familiar with indications for BS [43, 44, 54]	believe that diet and exercise are effective means of obtaining sustained weight loss in morbidly obese patients [43, 59]	believe that obesity treatment is futile [41]
	do not know how to discuss BS with morbidly obese patients [43]	suppose that most patients could not afford BS [43, 44]	patients with obesity are lazy / have no willpower [41, 45]
		perception of BS as dangerous [44, 59]	believe that BS should not be publicly funded [59]
	do not feel confident in providing postoperative management [43]	feeling discomfort by offering a surgical approach to a condition that has been traditionally addressed with diet and exercise [60]	reluctance to do some screening tests in patients with obesity [41]
	do not know the availability of the referral BS center [43]		feel that treating obesity is greater waste of time than the treatment of thinner patients [41]

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